CLAIMS

1. A curved tempered glass sheet manufacturing method comprising the steps of:

heating a glass sheet to near its softening temperature in a furnace;

bending the heated glass sheet to a predetermined shape to provide a bent glass sheet; and

changing the curved shape of the bent glass sheet by, while the bent glass sheet is restrained in shape by a pair of a plurality of upper curved support rollers and a plurality of lower curved support rollers and conveyed in a substantially horizontal direction, quenching the bent glass sheet with different cooling powers being applied to upper and lower surfaces thereof.

2. A curved tempered glass sheet manufacturing method according to claim 1, wherein each of the upper and lower curved support rollers comprises plural large-diameter, segmented rollers provided on a curved core support roller shaft, and the surface of each of the large-diameter rollers is covered with a heat-resistant material.

3. A curved tempered glass sheet manufacturing method according to claim 1, wherein the shape of the bent glass sheet is changed by air of different pressures blown to the upper and lower surfaces of the bent glass sheet.

4. A curved tempered glass sheet manufacturing method according to claim 1, wherein the step of bending the glass sheet to a predetermined shape includes providing a bending mold above the glass sheet and a heat-resistant belt between the bending mold and the glass sheet so that during its conveyance, the glass sheet is bent into the predetermined shape by pressing it together with the belt against bending mold.

5. A curved tempered glass sheet manufacturing method according to claim 1, wherein when a gap T1 of an upstream part of between the upper and lower curved support rollers is given as (t+α1), obtained by adding a first clearance α1 to the glass sheet thickness t, and a gap T2 of a downstream part is given as (t+α2), obtained by adding a second clearance α2 to a glass sheet thickness t, α1 is smaller than α2.

6. A curved tempered glass sheet manufacturing method according to claim 5, wherein the first clearance α1 is 0 mm ≤ α1 ≤ 3 mm.

7. A curved tempered glass sheet manufacturing apparatus, comprising:

a furnace for heating a glass sheet to near its softening temperature;

a preliminary bending apparatus for bending the glass sheet heated in the furnace to a predetermined shape; and

a quenching/secondary bending apparatus for changing the curved shape of the bent glass sheet by, while the bent glass sheet bent by the preliminary bending apparatus is restrained in shape by upper and lower curved support rollers and conveyed in a substantially horizontal direction, quenching the bent glass sheet with different cooling powers being applied to upper and lower surfaces thereof.

8. A curved tempered glass sheet manufacturing apparatus according to claim 7, wherein the quenching/secondary bending apparatus has quenching means for changing the shape of the bent glass sheet by air of different pressures blown to upper and lower sides of the bent glass sheet.

9. A curved tempered glass sheet manufacturing apparatus according to claim 7, comprising gap adjusting means which, when a gap T1 of an upstream part of

between the upper and lower curved support rollers is set to be (t+α1), obtained by adding a first clearance α1 to a glass sheet thickness t, and a gap T2 of a downstream part is set to be (t+α2), obtained by adding a second clearance α2 to a glass sheet thickness t, allows for adjustment such that α1 becomes smaller than α2.